University of Bahrain
College of Information Technology
Department of Computer Engineering

ITCE 202: Digital Logic
Test 1

Time: 1:00 hour

Date: November 2nd, 2004

Question	Marks	Score
1	24	
2	18	
3	18	
4	20	
5	20	
Total	100	

ID. No.	Name:	Sec.:

Show all your work.

Q1 (24 points)

(4 points) (a) Convert $(326.5)_8$ to Hexadecimal

(4 points) (b) The following number 1 1 1 0 0 0 0 1 1 0 0 1 0 1 1 1 represents decimal digits in 4-3-2-1 weighted code. Find its equivalent in BCD weighted code.

(8 Points) (c) Divide in binary 1 1 1 0 1 00 by 1 0 1 0 and approximate the result up to two fraction bits.

(8 Points) (d) Perform the binary addition of the two decimal numbers (+39) and (-28), assume that the numbers are represented in 2's complement form.

Q2- (18 points)

(10 Points) (a) Simplify the following function to a minimum Sum of product form

$$Z = A\,\overline{B}\,C + F + (A\,\overline{B}\,D + C\,\overline{D})(\overline{C}\,E + \overline{F} + A\,\overline{B}\,D)$$

(8 Points) (b) Given that: $Z = \overline{EG}\,(A \oplus B + \overline{CE})(\overline{A} + BG)$

Use De'Morgan's Theorem to find $\overline{Z}$. Express your answer in a sum of product form (Do not simplify).

Q3 (18 points)

For the circuit shown in figure 1, find:

(10 Points) **(a)** Z in a standard Sum of product (minterm form)

(8 Points) **(b)** $\overline{Z}$ in a standard product of sums (algabric form).

Q4 (20 points)

Realised the function Z given by the following equation using the minimum number of 2-inputs NAND gates only.

$Z = \overline{A}\,B\,C\,\overline{D} + E\,\overline{F} + B\,\overline{D}\,\overline{G} + B\,\overline{D}\,\overline{E}$

Q5- (20 points)

Given the Boolean function: $F = \overline{A}CD + AB\overline{CD} + ABC + ACD + \overline{A}B\overline{C}D$

Assuming that the inputs ABCD = 0000, ABCD = 1000, and ABCD = 1101 never occur, find a minimum NOR-NOR network implementation for F.